

PATENT CLAIMS

1. Microfocus x-ray apparatus,
having an x-ray tube that is provided with a target,
5 having means for bombarding the target with a target stream,
and
having means for regulating the intensity (dose rate) of the x-ray
radiation that is produced,
characterized in that,
10 the means for regulating the intensity of the x-ray radiation (20)
include means for regulating at least one parameter of the target
stream, in particular the current strength of the target stream.
2. Microfocus x-ray apparatus according to claim 1, **characterized**
15 **in that** the target (6) is disposed on a main body (8) of the x-ray
tube (4) such that it is electrically insulated relative to the main
body (8).
3. Microfocus x-ray apparatus according to claim 1, **characterized**
20 **by** a current sensor (24) for detecting an actual value of the
current strength of the target stream.

4. Microfocus x-ray apparatus according to claim 1, **characterized in that** the means for regulating the target stream include a regulating device (22).
5. Microfocus x-ray apparatus according to claim 4, **characterized in that** the regulating device (22) compares a detected actual value of the target stream with a prescribed desired value of the target stream and alters a control value in such a way that the difference between the desired value and the actual value is minimized.
6. Microfocus x-ray apparatus according to claim 1, **characterized by** a high voltage generator (12) for producing a preferably essentially constant high voltage by means of which the electrons, preferably electrons released from a cathode, for producing an emission stream (14) of the x-ray tube (4) can be accelerated in the direction toward the target (6).
7. Microfocus x-ray apparatus according to claim 6, **characterized in that** the control value is the emission stream.

8. Microfocus x-ray apparatus according to claim 4, **characterized in that** the regulating device (22) has an electrical or electronic control circuit that forms a controller.
- 5 9. Microfocus x-ray apparatus according to claim 4, **characterized in that** the regulating device (22) is provided with an electronic control circuit that is controllable via a regulating software such that the regulation is effected in a software-controlled manner.
- 10 10. Microfocus x-ray apparatus according to claim 8, **characterized in that** the electronic control circuit is provided with a microcontroller or the like.
- 15 11. Microfocus x-ray apparatus according to claim 1, **characterized in that** the regulation of the target stream can be activated and deactivated.
- 20 12. Microfocus x-ray apparatus according to claim 11, **characterized in that** with regulation of the target stream deactivated, a further regulating device regulates the emission stream (14) of the x-ray tube (4).

13. Microfocus x-ray apparatus according to claim 11, **characterized in that** a momentary flowing target stream during the activation of the regulation of the target stream forms the desired value of the target stream.

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14. Microfocus x-ray apparatus according to claim 12, **characterized in that** a momentary flowing emission stream (14) during the deactivation of the regulation of the target stream forms a desired value for the regulation of the emission stream (14) by the further regulating device.

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15. Microfocus x-ray apparatus according to claim 4, **characterized in that** the regulating device (22) regulates the target stream in such a way that an exceeding of a prescribed or prescribeable maximum electrical output of the target (6) is prevented.

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16. Microfocus x-ray apparatus according to claim 11, **characterized in that** an activation of the regulation of the target stream is effected in a chronologically delayed manner after an activation of the microfocus x-ray tube (4).

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17. Microfocus x-ray apparatus according to claim 16, **characterized in that** the activation is effected when the emission stream (14) achieves a prescribed or prescribeable desired value.

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18. Microfocus x-ray apparatus according to claim 11, **characterized in that** upon an alteration of the desired value of the high voltage, a deactivation of the regulation of the target stream is effected until a new desired value of the high voltage is achieved.

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19. Microfocus x-ray apparatus according to claim 6, **characterized in that** regulating parameters of the regulating device (22) can be altered as a function of the high voltage.

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20. Microfocus x-ray apparatus according to claim 19, **characterized in that** with a reduction of the high voltage the regulating parameters are altered such that the lag time of the regulation is increased, and in that with an increase of the high voltage the regulating parameters are altered such that the lag time of the regulation is reduced.

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21. Microfocus x-ray apparatus according to claim 1, **characterized in that** the x-ray tube (4) is provided with means via which the emission stream can be deflected or blocked in such a way that a striking of the emission stream (14) upon the target (6) is essentially prevented.

22. Microfocus x-ray apparatus according to claim 21, **characterized in that** upon activation of the means via which the emission stream (14) can be deflected or blocked, a deactivation of the regulation of the target stream is effected.

23. Microfocus x-ray apparatus according to claim 11, **characterized in that** means are provided that determine whether a short circuit is present at the target (6), and in that upon determination of a short circuit, the means deactivate the regulation of the target stream.

24. Method of regulating the intensity (dose rate) of the x-ray radiation produced by an x-ray tube of a microfocus x-ray apparatus,
whereby the x-ray tube is provided with a target and means for bombarding the target with a target stream,

characterized in that,

for the regulation of the intensity of the x-ray radiation, at least one parameter of the target stream, in particular the current strength of the target stream, is regulated.

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25. Method according to claim 24, **characterized in that** an actual value of the current strength of the target stream is detected.

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26. Method according to claim 24, **characterized in that** a detected actual value of the target stream is compared with a prescribed desired value of the target stream and a control value is altered in such a way that the difference between the desired value and the actual value is minimized.

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27. Method according to claim 24, **characterized in that** by means of a high voltage generator a preferably essentially constant high voltage is produced by means of which the electrons, preferably electrons released from a cathode, for the production of an emission stream of the x-ray tube, are accelerated in the

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direction toward the target.

28. Method according to claim 27, **characterized in that** the emission stream is used as the control value.

29. Method according to claim 24, **characterized in that** the regulation of the target stream can be activated and deactivated.

30. Method according to claim 29, **characterized in that** with the regulation of the target stream deactivated, the emission stream of the x-ray tube is regulated.

31. Method according to claim 30, **characterized in that** a target stream that momentarily flows during the activation of the regulation of the target stream is used as the desired value of the target stream.

32. Method according to claim 29, **characterized in that** an emission stream that momentarily flows during the deactivation of the regulation of the target stream is used as the desired value for the regulation of the emission stream.

33. Method according to claim 24, **characterized in that** the target stream is regulated in such a way that an exceeding of a

prescribed or prescribeable maximum electrical output of the target is prevented.

5 34. Method according to claim 29, **characterized in that** after an activation of the microfocus x-ray tube, the regulation of the target stream is activated in a chronologically delayed manner.

10 35. Method according to claim 34, **characterized in that** the regulation of the target stream is activated when the emission stream has achieved a prescribed or prescribeable desired value.

15 36. Method according to claim 29, **characterized in that** upon an alteration of the desired value of the high voltage, the regulation of the target stream is deactivated until a new desired value of the high voltage is achieved.

20 37. Method according to claim 24, characterized in that regulating parameters of the regulation are altered as a function of the high voltage.

38. Method according to claim 37, **characterized in that** upon a reduction of the high voltage the regulating parameters are altered in such a way that the lag time of the regulation is increased, and in that upon an increase of the high voltage the regulating parameters are altered in such a way that the lag time of the regulation is reduced.

39. Method according to claim 29, **characterized in that** upon a deflection or blocking of the emission stream in such a way that a striking of the emission stream upon the target is essentially prevented, the regulation of the target stream is deactivated.

40. Method according to claim 29, **characterized in that** it is determined whether a short circuit exists at the target, and in that upon determination of a short circuit the regulation of the target stream is deactivated.